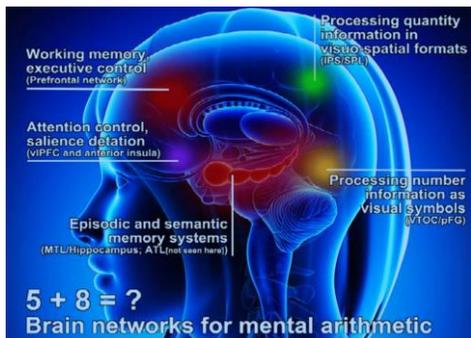# Spot On With Numbers Provides a Visual Representation for Numbers


'Neuroimaging has shown that even when people work on a number calculation, such as 12 x 25, with symbolic digits (12 and 25) our mathematical thinking is grounded in visual processing' (Boaler and Chen, 2016).

If children are encouraged to visualise numbers from a young age, they are given strong skills for later mathematical ability. Visualisation techniques are key for problem solving at all levels of maths. If number facts are taught through visualising, the emphasis on pure memorisation can be removed which is potentially damaging to children who do not have strong retention skills. Furthermore, rote memorisation can negatively effect conceptual understanding and gives children the idea that maths is about a dull set of facts and algorithms to be learnt instead of a creative subject which requires flexible problem solving and reasoning skills.
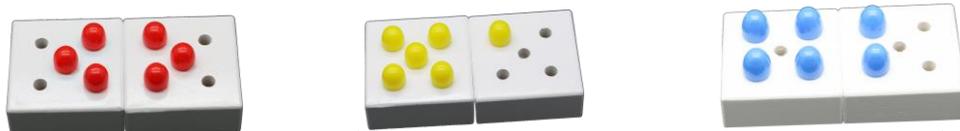
Children can choose which way they would like to visualise a number using the pegs and boards. This gives them flexibility and links to the different arrangements that their fingers can show a number. The printed number line shows a strong visual representation of numbers, but children who use the pegs and boards should also be confident explaining how the representations can vary.
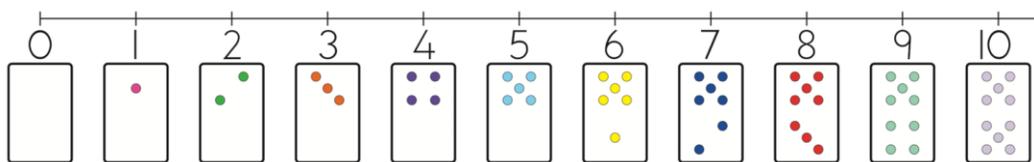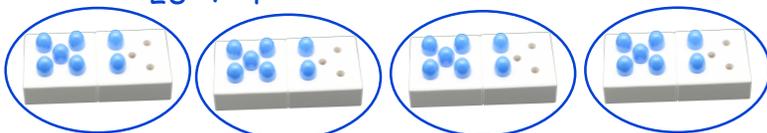

7 x 4
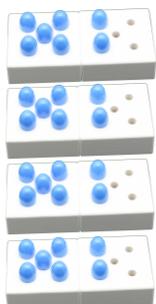
Children can see visualise multiplication facts and see links between multiplication and division.

28 ÷ 4

Most resources which can be manipulated, leave a random arrangement which is difficult to be subitised and the links are less evident.

5 x 4 = 20   2 x 4 = 8

\+   = 28

On the left is one of many examples of where the links between multiplication facts can be explored. The pegs and boards do not only show the link to the fives, but also the link between facts (for instance the link between the twos, fours and eights; the link between the threes and sixes; the link between the 9 and 10 times table etc).

The part part whole nature of the resource exposes children to the distributive law (see the example of 7 x 4 above) which also has positive implications for multiplicative reasoning (including ratio).